

ELECTROMAGNETIC STIRRING METHOD FOR THE CONTINUOUS CASTING OF FLAT METAL PRODUCTS

Abstract

During a continuous slab casting operation, in which the molten metal is introduced into a mould (1) via a submerged nozzle (4) having lateral discharge outlets (5, 5') opening towards the narrow faces (3, 3'), the stirring according to the invention uses moving magnetic fields that act, in pairs, at least in the secondary cooling zone of the casting plant, by travelling collinearly between them in opposite directions so as to forcibly establish a middle longitudinal circulation in the liquid pool as two opposing collinear streams, which produce an global movement in the form of a "four-leaf clover", the upper lobes (L1, L4) of which extend into the mould to near the discharge jets 7, 7' coming from the outlets of the nozzle, in order to brake the said jets or to accelerate them, as required.

The invention provides overall stirring of the metal over the metallurgical length, thereby ensuring both thermal and chemical uniformity between the top and bottom of the liquid pool without correspondingly being deprived of the beneficial effects specific to stirring in the mould and in the secondary cooling zone respectively, and without disturbing, but rather stabilizing, the local flow mode in the mould.

Figure for the Abstract: Figure 5